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WATER SERVICING & CAPACITY ASSESSMENT

Revision 5 – Council Information Request Item 4

**134 South Street
Thornlands QLD 4164**

Prepared for Development
Application (MCU)

Lot 1 on RP124525

Multiple dwelling, 15 units

12 × 2-bedroom · 3 × 3-bedroom



POTABLE WATER SUPPLY



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DOCUMENT CONTROL

CURRENT ISSUE WATER SERVICING & CAPACITY ASSESSMENT

REVISION 5
Public issue

PROJECT PARTICULARS

Site / project	134 South Street, Thornlands QLD 4164
Lot on plan	Lot 1 on RP124525
Land area	1,010.8 m ² (adopted site area; drawing 2.1 Issue A schedules 1,011 m ²)
Development / scope	Multiple dwelling, 15 units (12 two-bedroom and 3 three-bedroom); domestic water supply, metering and fire-fighting supply concept
Client / Council reference	MCU26/0056 (pre-lodgement meeting PLM25/0045)
External / agency reference	Redland City Council Information Request, 9 June 2026, Item 4
Prepared for	Development application MCU26/0056; response to water Information Request Item 4

AUTHORSHIP & ISSUE

Role	Name	Position	Registration / credential
Prepared by	Craig Harris	RPEQ Civil Engineer	RPEQ 13194
REVISION DATE 15 October 2026	DOCUMENT STATUS Revision 5, Public issue of the final Council submission (Revision 3)		ISSUE RESTRICTION / PURPOSE Response to RCC Information Request Item 4, MCU26/0056, on Redland Water's published standards of service; not for construction; Council site-specific data applied at operational works

REVISION HISTORY

Table 1: Revision history

Rev.	Date	Status	Description
1	December 2025	Not issued	Preparation version, superseded by Revision 2
2	9 January 2026	Issued for DA lodgement	Original water service report lodged as Appendix C of the application
3	22 September 2026	For RFI response	Response to RCC Information Request Item 4: source and assumption register, existing network and zone maps, domestic and fire pressure budgets on Redland Water's published standards of service, sensitivity, separate-service concept WS-01, PO5 to PO9 response and operational-works information requirement. Council flow and pressure data requested 21 September 2026 for operational works.
4	24 September 2026	Not issued	Review revision with the supplied water-network model assessment; that assessment was issued within the Stormwater Management Plan, Revision 5.
5	15 October 2026	Public issue	Public issue of Revision 3: a personal name, an internal action note and a working reference note removed; no change to engineering content.

CURRENT: Revision 5 is the public issue of Revision 3, the response to the Council Information Request on Redland Water's published desired standards of service, which superseded Revision 2 for the water matters of the application. Council's site-specific flow and pressure data, requested 21 September 2026, is applied at operational works before the services and pumps are sized. The engineering content of Revision 3 is unchanged.

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1. INTRODUCTION

1.1 Purpose

This Water Servicing and Capacity Assessment supports development application MCU26/0056 for a 15-unit multiple dwelling at 134 South Street, Thornlands (Lot 1 on RP124525). Revision 3 responds to Item 4 of Redland City Council's Information Request dated 9 June 2026 [R1]: it describes the proposed water meter and connection concept, states whether a booster is required for the fire-fighting provision, and assesses the proposal against performance outcomes PO5 to PO9 of the Infrastructure Works Code. It assesses the existing supply at Redland Water's published desired standards of service; Council's site-specific flow and pressure data, requested on 21 September 2026, is an operational-works input.

1.2 Application background

The original water service report (Revision 2, 9 January 2026) was lodged as Appendix C of the application. Council's Information Request asked for a civil concept plan and a booster determination. On 21 September 2026 the applicant asked Council's water team to identify the connection asset and pressure zone and to supply current and ultimate flow-pressure information at the nominated takeoff; that data is not needed to answer the request and is applied at operational works before the services and pumps are sized, so this assessment adopts the published standards of service as the existing level of service.

1.3 Scope of this revision

Revision 3 replaces the Revision 2 unquantified capacity assertion with: a source and assumption register; maps of the existing network and pressure zones from Council's asset mapping; a domestic demand estimate and pressure budget; the fire-system basis from the National Construction Code and the resulting brigade booster and pressure-boosting assessment; a sensitivity check; the separate-service concept drawing WS-01 and its schematic; an outcome-by-outcome PO5 to PO9 response; and a defined information requirement. The figures and tables that will carry Council's site-specific data at operational works are drawn now on the published standards, so the data can be dropped in without restructuring.

1.4 Basis of assessment

The assessment is a development-application level concept. It uses public and supplied Council information, the lodged and current architectural plans, Redland Water's published desired standards of service adopted as the existing level of service, and stated hydraulic inputs. No site survey, service locating or field flow test has been undertaken. Table 2 lists the information relied upon.

Table 2: Information sources relied upon in Revision 3

Source	Description	Use in this assessment
Redland City Council Information Request [R1]	MCU26/0056, 9 June 2026, Water Item 4	Request wording, section 2
Architectural plans [R2, R3]	Drawing 2.1 Issue A, 30 October 2025 (submitted); Issue C, 15 June 2026	Unit mix, site dimensions, frontage layout for WS-01
Council Asset Mapping [R4]	Public GIS service: water pressure pipes, hydrants, valves and district metered areas, queried 22 September 2026	Existing assets, pressure zone and maps (Figures 1 and 2, Table 4)
Council supplied data set [R5]	Objective Connect collection inspected 21 September 2026	No site-specific water supply flow or pressure result identified
Redland City Plan version 14 [R6]	Infrastructure Works Code, PO5 to PO9	Section 9 assessment

Source	Description	Use in this assessment
Redland Water Netserv Plan Part A, 2017 [R7]	Table 12-1 desired standards of service	Table 5; average-day demand and fire-flow benchmarks
Council connection guidance [R8]	Water and sewerage connections; water meters; information for hydraulic designers	Separate connections, meter arrangement, flow and pressure report route
NCC 2022 Volume One and AS 2419.1 [R9]	Clauses E1D2 and E1D6; brigade booster assembly	Fire-system basis, section 7.1
Public development application documents [R10]	Seven nearby applications with supply evidence, read 21 September 2026	Context only (Figure 2, Table 6); no site value adopted
Calculation record [C01 to C03]	Reproducible pressure-budget and sensitivity calculations on the published standards of service	Tables 9 to 12, Figures 3, 5 and 6

The PO5 to PO9 assessment uses the Infrastructure Works Code text in the held City Plan version 14, printed page 393 (PDF page 397); the applicable assessment version is subject to confirmation by the applicant's town planner. The 2017 Netserv Plan desired standards of service are adopted as the existing level of service for this assessment; they are Redland Water's published network standards, not a site-specific measurement, and Council's site-specific data is applied at operational works. The fire-system basis is stated in section 7.1 from NCC 2022 Volume One and AS 2419.1-2021 as the designer's interpretation; the certifier confirms the governing edition at building approval, and AS/NZS 3500.1 applies to the internal service design. [R6 to R9]

2. COUNCIL INFORMATION REQUEST AND RESPONSE SUMMARY

“Provide a civil concept plan illustrating the location and details of the proposed water meter and if a booter is required for the fire fighting provision for the development. In doing so demonstrate compliance with performance outcomes PO5 to PO9 of the infrastructure works code.” [R1, PDF page 2, Water Item 4]

The word “booter” is retained in the quotation and interpreted as “booster”. This report addresses both a brigade booster assembly and pressure-boosting pumps.

Table 3 lists each element of the request and where it is answered.

Table 3: Council Information Request Item 4: elements of the request and where each is answered

Element of Council's request (Item 4)	Where it is answered	Status in this revision
Civil concept plan illustrating the location and details of the proposed water meter	Section 6 (Figure 4 schematic, meter and connection detail); Appendix A drawing WS-01	Provided at concept level; locations provisional (A08)
Whether a booster is required for the fire-fighting provision: brigade booster assembly	Section 7.1	Yes: required for the hydrant system under NCC 2022 E1D2 and AS 2419.1 (designer's interpretation)
Whether a booster is required for the fire-fighting provision: pressure-boosting pump	Sections 5.2, 7.2, 7.3 and 8.1; Figures 5 and 6	Yes on the published standards of service: fire pump set (screening 30 L/s at 800 kPa) and a domestic boosting arrangement; duties set at operational works
Demonstrate compliance with performance outcomes PO5 to PO9 of the Infrastructure Works Code	Section 9, Table 13	PO5 and PO9 demonstrated on the published standard; PO6 to PO8 concept responses
Council's site-specific supply data (requested by the applicant on 21 September 2026)	Section 3.4, Table 7 and Figure 3	Operational-works input; confirms A04 and A09 before service and pump sizing

3. EXISTING WATER SUPPLY INFRASTRUCTURE

3.1 Network and pressure zone

Council GIS evidence identifies the frontage main as asset 55284, 250 mm uPVC, attributed to DMA 204 Bunker Road South. The main on the opposite side of South Street is attributed to zone 300. This assessment selects the frontage main provisionally. The GIS record is not a service locating survey and does not establish pressure, depth, tapping suitability or available capacity. [R4, asset 55284 and District Metered Area attributes]

Figure 1 maps the Council water assets around the site from the public asset mapping service queried on 22 September 2026 [R4]. The frontage main, asset 55284, is a 250 mm uPVC main in District Metered Area 204 Bunker Road South, a pressure-managed area fed from the Heinemann Road Reservoirs through the zone 250 trunk. South Street is a zone boundary: the 150 mm asbestos-cement main on the opposite verge is in zone 300 Alexandra Hills Low Level Zone, and a 375 mm trunk runs north to south west of the site. Table 4 lists the assets relevant to the connection with their offsets from the lot boundary.

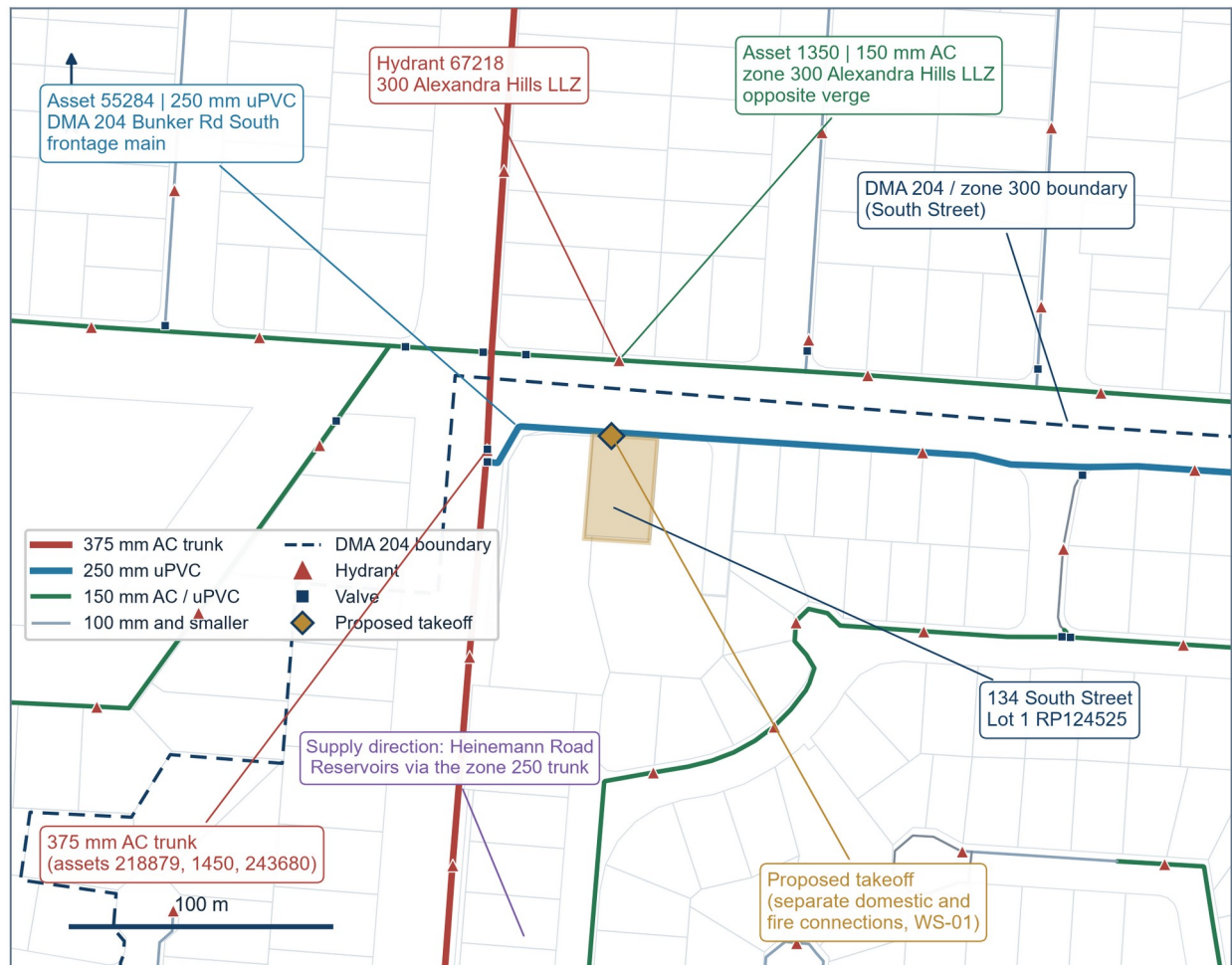


Figure 1: Existing water network and pressure-zone context at the site

Source: Redland City Council Asset Mapping, layers Water Pressure Pipes, Water Hydrants, Water Valves and District Metered Areas, queried 22 September 2026; property outlines from Council IDM data; coordinates GDA2020 MGA Zone 56. The proposed takeoff is the WS-01 concept position and is provisional. The map is not a service locating survey and does not establish depth, condition or available capacity.

Table 4: Existing water assets relevant to the connection, from Council Asset Mapping

Asset ID	Size and material	Pressure zone (DMA)	GIS length (m)	Offset from lot (m)	Role in this assessment
55284	250 mm uPVC	204 Bunker Road South	172.5	1	Frontage main; proposed connection (provisional)
55285	250 mm uPVC	204 Bunker Road South	63.6	102	Continuation of the frontage main east
1350	150 mm AC	300 Alexandra Hills LLZ	107.9	29	Opposite-verge main, different zone; not selected
243680	375 mm AC	204 Bunker Road South	246.9	40	Trunk main west of the site, DMA 204
1352	375 mm AC	300 Alexandra Hills LLZ	426.5	50	Trunk main west of the site, zone 300
218879	375 mm AC	204 Bunker Road South	4.9	40	Trunk connector at the zone boundary
67218	Hydrant, 150 mm main	300 Alexandra Hills LLZ	—	29	Nearest hydrant, opposite verge, zone 300
55211	Hydrant, 250 mm main	204 Bunker Road South	—	102	Nearest hydrant on the frontage main, DMA 204
67425	Hydrant, 375 mm main	204 Bunker Road South	—	63	Hydrant on the 375 mm trunk, DMA 204
66841	Zone boundary valve, 150mm	210 Thornlands	—	99	Boundary between DMA 204 / zone 300 / zone 210 near the site
67320	Zone boundary valve, 375mm	300 Alexandra Hills LLZ	—	40	Boundary between DMA 204 / zone 300 / zone 210 near the site

Source: Council Asset Mapping layer attributes ASSET_ID, ASSET_NAME, FL_NAME_L1, ASSET_DIAMETER, PIPE_MATERIAL and ASSET_LENGTH, queried 22 September 2026 [R4]; offsets are the minimum planar distance from the mapped asset to the DCDB lot boundary. GIS lengths are the whole mapped asset, not the frontage length.

3.2 Desired standards of service

Redland Water's Netserv Plan Part A (2017) states the key desired standards of service for the water supply network in its Table 12-1 [R7]. Table 5 reproduces the standards used in this report. They are utility planning benchmarks, not a site-specific supply result or a connection guarantee.

Table 5: Redland Water desired standards of service applied in this assessment

Standard (Netserv Plan Part A, Table 12-1)	Value	Use in this report
Average day demand	230 L/EP/day (including non-revenue water)	A02, demand estimate, Table 9
Minimum operating pressure	22 m at the property boundary	A04: available pressure for the domestic case (Tables 10 and 12, Figures 3 and 5)
Maximum operating pressure	55 m at the property boundary	Reference line on Figure 3; shutoff and pressure-rating checks at design
Fire flow, general urban, residential over 3 storeys	30 L/s for 4 hours	A07 screening demand and A09 flow availability; 12 m residual adopted for the fire case (Tables 11 and 12, Figures 3, 5 and 6); section 7.3
Background demand for fire flow	Two-thirds of peak hour (predominantly residential)	Scenario for the fire case; Council's flow and pressure report is to state it at operational works
Maximum pipeline velocity	2.5 m/s	Service velocities in Tables 10 and 11 are within this limit

3.3 Supply evidence available

The Council Objective Connect collection was inspected; no usable site-specific water supply flow/pressure result was identified. Nearby DA reports provide context only. A same-zone test at Beveridge Road does not establish conditions at this connection; adjacent-zone data must not be substituted for the frontage supply. [R5; R4; R10]

Figure 2 places the site in its pressure zone with the public development-application evidence found within about 3.5 km, and Table 6 summarises each result and why it cannot be transferred to the frontage main. The only same-zone measured test is at Beveridge Road, 3.4 km away; the Cleveland tests are in zone 300 and the Thornlands model results are in the adjacent pressure-reduced zones 210, 250 and 208 on the same Heinemann Road source. Together they give an order-of-magnitude picture of the district, not the pressure at this takeoff.

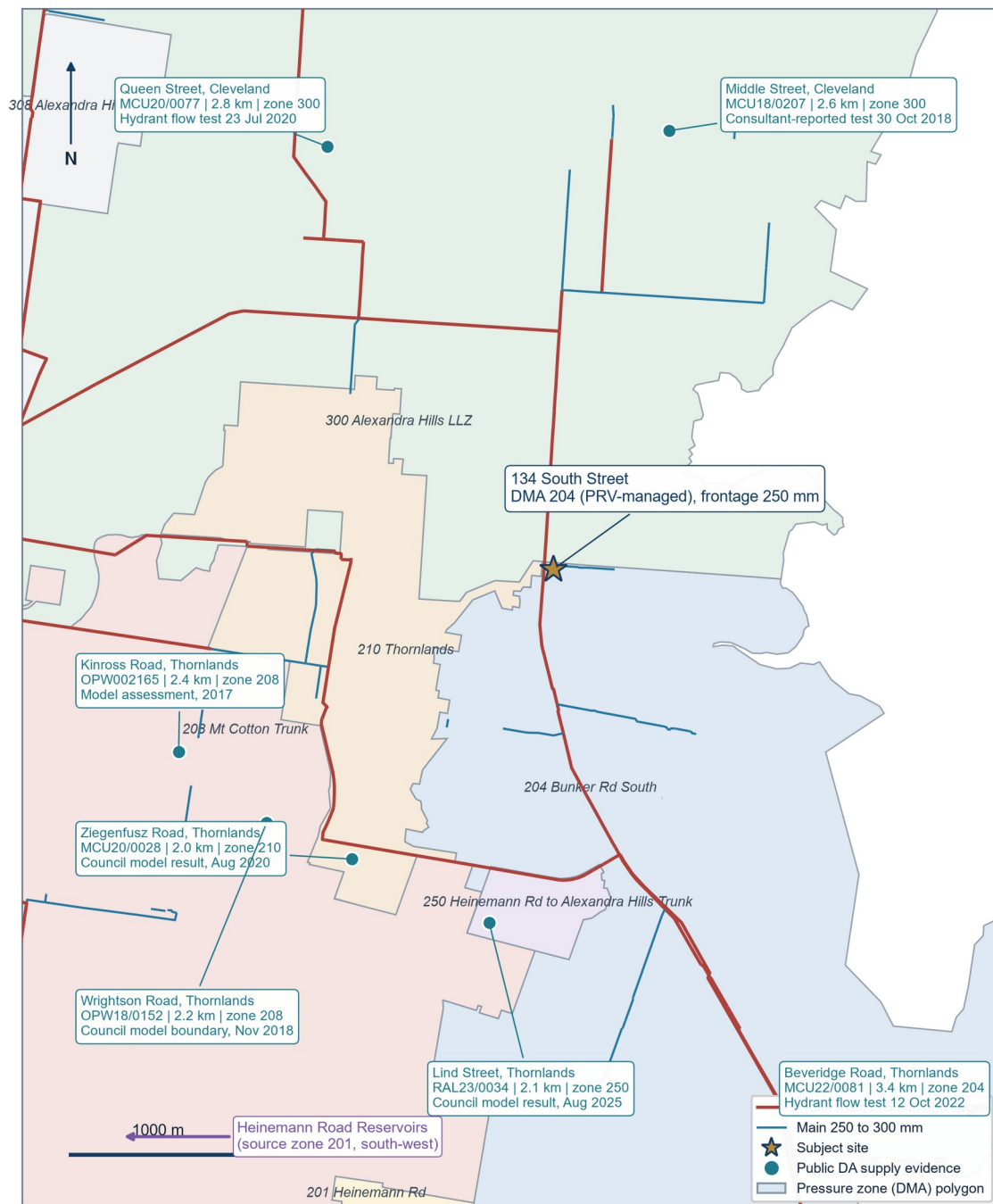


Figure 2: Pressure zones, trunk mains and the nearby public supply evidence around the site

Source: Council Asset Mapping District Metered Areas and Water Pressure Pipes layers (mains 250 mm and larger drawn), queried 22 September 2026 [R4]; evidence points at the portal application locations with zone attribution from the same service; distances are straight-line application-centroid separations [R10]. The Heinemann Road Reservoirs lie in source zone 201 south-south-west of the map.

Table 6: Nearby public development-application supply evidence and its applicability

Site and application	Distance and zone	Evidence and date	Result as stated	Why it is not site evidence
Beveridge Road, Thornlands MCU22/0081	3.4 km, zone 204	Hydrant flow test 12 Oct 2022	Static 580 kPa; 550 kPa residual at 30 L/s	Same DMA but 3.4 km away on a 150 mm main; elevation, intervening losses and current conditions unverified
Middle Street, Cleveland MCU18/0207	2.6 km, zone 300	Consultant-reported test 30 Oct 2018	Static 630 to 640 kPa; 610 kPa residual at 20 L/s	Zone 300 (opposite-verge main), 2.6 km; consultant letter only, raw test sheet not held
Queen Street, Cleveland MCU20/0077	2.8 km, zone 300	Hydrant flow test 23 Jul 2020	Static 460 kPa; 415 kPa residual at 30 L/s	Zone 300, 2.8 km; different zone from the frontage main
Ziegenfusz Road, Thornlands MCU20/0028	2.0 km, zone 210	Council model result, Aug 2020	Min 42.8 m (2017); hydrant 15 L/s 23.9 m peak hour	Adjacent PRV zone 210 with its own PRV setting; model result, not the frontage main
Lind Street, Thornlands RAL23/0034	2.1 km, zone 250	Council model result, Aug 2025	Min 37.7 m; 36.1 m at 15 L/s	Trunk zone 250 upstream of the DMA 204 PRV; model result
Wrightson Road, Thornlands OPW18/0152	2.2 km, zone 208	Council model boundary, Nov 2018	229 to 248 kPa peak hour; 142 to 248 kPa fire	Zone 208, a separate PRV zone on the same source; model boundary levels
Kinross Road, Thornlands OPW002165	2.4 km, zone 208	Model assessment, 2017	29.4 m standard flow; 12.0 m fire flow	Zone 208; 2017 model with a pump station operating scenario

3.4 Council flow and pressure data

For this response the existing supply is taken at Redland Water's published desired standards of service (Table 5): 22 m minimum operating pressure at the property boundary for the domestic case, and 30 L/s for four hours at 12 m residual for the fire case, the latter being Council's stated standard in its own preliminary assessments [R10]. Council's route for site-specific data is the Water Network Flow and Pressure Information Report, which gives current and ultimate flow-pressure curves at the nominated node at two-thirds peak-hour background demand, the zero-fire-flow pressure and the fire-flow desired standard plotted on the curves; it excludes the development's own demand and is not field-verified [R8]. The applicant's request of 21 September 2026 is an operational-works input: Table 7 and Figure 3 carry the standards-based values now, with the required takeoff pressures from sections 5 and 7, so Council's curves can be added before the services and pumps are sized.

Table 7: Available pressure at the nominated takeoff: published standard adopted, Council data at operational works

Node	Scenario	Background demand	Static (kPa)	Residual at 3 L/s (kPa)	Residual at 15 L/s (kPa)	Residual at 30 L/s (kPa)
Takeoff, asset 55284	Published standard adopted (A04)	Peak hour / two-thirds peak hour	not stated	216 (22 m minimum)	118 (12 m residual)	118 (12 m residual)
Takeoff, asset 55284	Council model, current network	Two-thirds peak hour	at operational works	at operational works	at operational works	at operational works

Node	Scenario	Background demand	Static (kPa)	Residual at 3 L/s (kPa)	Residual at 15 L/s (kPa)	Residual at 30 L/s (kPa)
Takeoff, asset 55284	Council model, ultimate network	Two-thirds peak hour	at operational works	at operational works	at operational works	at operational works

Standard rows from Netserv Plan Part A Table 12-1 [R7] and Council's stated 12 m fire-flow residual [R10]. Council rows: Water Network Flow and Pressure Information Report or the water team's reply to the request of 21 September 2026, stating node, model scenario, datum and background demand; entered at operational works without changing the table layout.

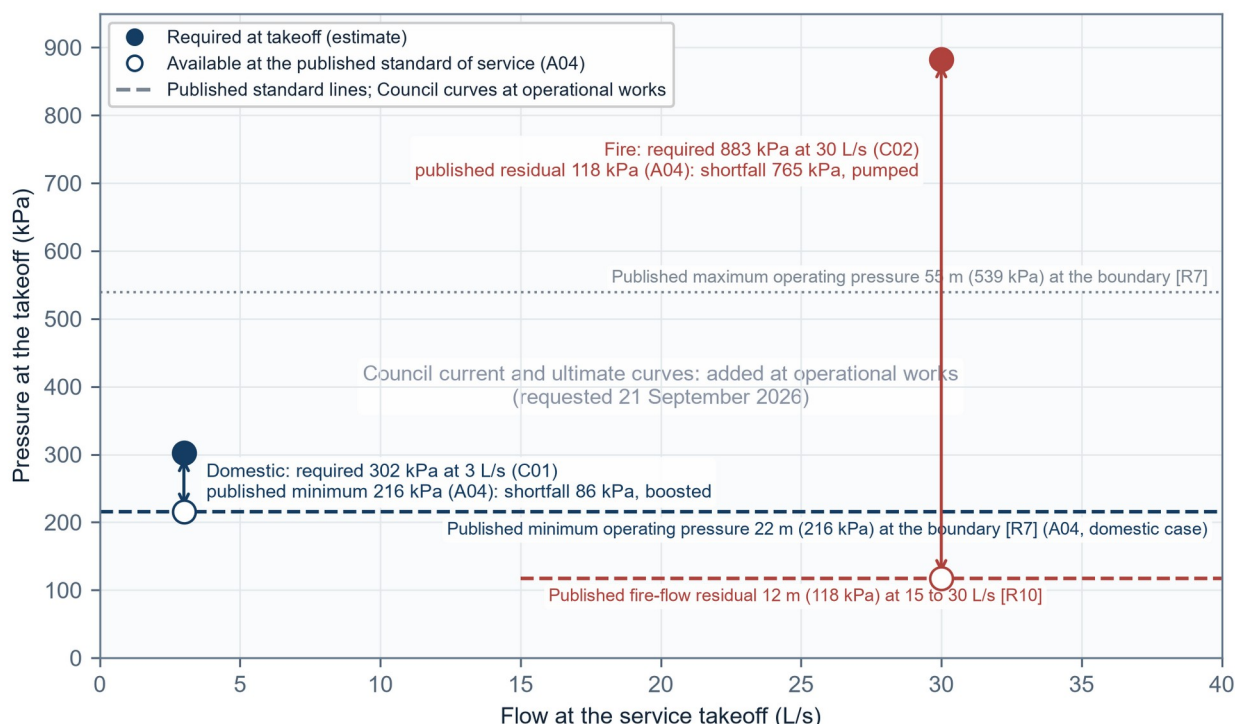


Figure 3: Flow and pressure at the service takeoff: required points against the published standards of service; Council curves at operational works

Required points from calculation cases C01 and C02 with inputs A03 to A07; available pressures are the published standards (A04): 22 m minimum at the boundary and 12 m residual at 30 L/s [R7, R10]. Council's current and ultimate curves at two-thirds peak-hour background demand are added at operational works.

4. DEVELOPMENT DESCRIPTION AND ASSUMPTIONS

4.1 Development and drawing basis

The submitted architectural plan identifies 15 dwellings: 12 two-bedroom and three three-bedroom units, with ground-level parking and residential accommodation above. The site is 1,011 m², with approximately 25.125 m South Street frontage and 40.2 m depth. [R2, drawing 2.1, Issue A, 30 October 2025, PDF page 2]

WS-01 uses the submitted Issue A plan as its base. The later architectural Issue C dated 15 June 2026 is held in the project; a sheet-by-sheet comparison on 21 September 2026 found the ground floor drawing 2.1 unchanged apart from the rear building outline strip and a boundary dimension, so the frontage layout that governs the meter and booster positions is the same in both issues. The proposed equipment locations remain subject to landscape and services coordination. [R2, R3, drawing 2.1, PDF page 2]

4.2 Assumption and verification register

Every entry marked ASSUMED is an input adopted for this assessment. No assumed pressure is represented as Council advice: the available pressures (A04) and the fire-flow availability (A09) are Redland Water's published desired standards of service, adopted as the existing level of service. Council's site-specific flow and pressure data, requested on 21 September 2026, is applied at operational works before the services and any pumps are sized.

Table 8: Assumption and verification register

ID / status	Adopted input and basis	Replacement / responsibility
A01 ASSUMED	3 persons per dwelling; 45 equivalent persons total. Occupancy allowance, not an occupancy approval.	Hydraulic designer: fixture and occupancy schedule.
A02 HISTORICAL BENCHMARK	230 L/EP/day including non-revenue water, held 2017 Netserv Table 12-1 [R7].	Council/designer: current planning loading criterion.
A03 ASSUMED	Domestic diversified peak 3 L/s; independent of average-day calculation.	Hydraulic designer: AS/NZS 3500.1 fixture-based demand.
A04 STANDARD	Existing service at Redland Water's desired standards of service: 22 m (216 kPa) minimum operating pressure at the property boundary for the domestic case; 30 L/s for 4 hours at 12 m (118 kPa) residual for the fire case, with two-thirds peak-hour background. Separate load cases; no curve between them.	Council: site-specific current/ultimate Q-H data at the nominated takeoff, applied at operational works; designer/certifier: verification method.
A05 ASSUMED	Domestic hydraulic bore 50 mm and route length 60 m; fire bore 150 mm and route length 80 m.	Designer: actual internal diameter, material and routed length.
A06 ASSUMED	Hazen-Williams C = 130; critical outlet 12 m above service takeoff; total device/fitting loss 5 m head in each base case.	Survey/designer: levels, fitting losses and manufacturer loss curves.
A07 ASSUMED	Domestic terminal target 100 kPa; fire target 700 kPa; fire demand 30 L/s. Fire systems fixed by NCC 2022 Volume One: hydrant system (E1D2) and sprinklers throughout (E1D6), with a brigade booster assembly to AS 2419.1; the 30 L/s and 700 kPa are screening criteria for the supply check, not the confirmed system duty.	Fire/hydraulic designer at building approval: combined demand, residual pressure and duration; certifier confirms the code basis.
A08 ASSUMED	Domestic meter alcove, brigade booster and fire pump reservation in west frontage landscaping; domestic service DN50 and fire DN150 nominal.	Council, architect, landscape and fire designer: acceptable siting, equipment geometry and connections.
A09 STANDARD	Flow availability of 30 L/s for 4 hours is taken from the published standard for residential buildings over three storeys; no on-site storage is required on that basis.	Council data at operational works: supply volume and duration; tank/site redesign only if the verified supply falls short.

Highest consequence inputs: A04 available pressure, A07 fire demand, pressure and duration, and A09 flow availability. If Council's data shows at least 302 kPa at the 3 L/s peak demand, domestic boosting may be deleted at operational works; if it shows less than the standard, the fire pump duty and any storage are revisited. No equipment purchase should be based on the screening duties.

5. DOMESTIC DEMAND

5.1 Demand estimate

Table 9: Domestic demand estimate

Calculation	Result / interpretation
15 dwellings × 3 persons/dwelling [A01]	45 EP
45 EP × 230 L/EP/day [A02]	10,350 L/day = 10.35 kL/day

Calculation	Result / interpretation
10,350 / 86,400	0.120 L/s average day; includes the historical benchmark's NRW allowance.
Adopted peak [A03]	3.00 L/s. An independent estimate, not a peaking-factor derivation from average demand.

The average-day figure screens network loading. It does not size the building service or replace a fixture-based calculation. Irrigation, common-area use, hot-water generation and any alternative-water supply must be included in the final hydraulic schedule.

5.2 Domestic pressure budget

Hazen–Williams: $hf = 10.67 L Q^{1.852} / (C^{1.852} D^{4.87})$, with L and D in metres, Q in m³/s and hf in metres of water. Assumed physical pipe length is used; the separate 5 m allowance covers devices and fittings, so fittings are not additionally added as equivalent length. Convert head using 9.80665 kPa/m.

For Q = 0.003 m³/s, D = 0.050 m, L = 60 m and C = 130: velocity = 1.53 m/s; pipe friction = 3.59 m. Required connection pressure = terminal 100 + 9.80665 × (elevation 12 + friction 3.59 + device allowance 5) = 301.9 kPa. Against the published minimum operating pressure of 22 m (215.7 kPa) at the property boundary, the shortfall is 86.2 kPa. [A03–A07; calculation record C01]

Table 10: Domestic service pressure budget at 3 L/s (C01)

Line	Basis	Head (m)	Pressure (kPa)
Terminal pressure at the critical outlet	Target adopted for screening (A07)	10.20	100.0
Elevation, takeoff to critical outlet	12 m (A06)	12.00	117.7
Pipe friction	Hazen–Williams, Q = 3 L/s, D = 50 mm, L = 60 m, C = 130 (A05, A06)	3.59	35.2
Device and fitting loss allowance	5 m lump allowance (A06)	5.00	49.0
Required pressure at the service takeoff	Sum of the lines above (C01)	30.79	301.9
Available pressure at the published standard	Redland Water desired standard of service (A04): 22 m minimum at the boundary	22.00	215.7
Shortfall to be boosted	Available minus required; velocity 1.53 m/s	-8.79	-86.2

A direct domestic service is therefore not demonstrated at the published minimum: the concept includes a proposed domestic pressure-boosting arrangement for the upper floors, screened at 100 kPa differential (about 14 kPa above the calculated shortfall). If Council's site-specific data at operational works shows at least 302 kPa at peak demand, the arrangement is deleted; otherwise the losses, service diameter and duty are finalised then. Any domestic pump is separate from the fire installation and requires a coordinated location.

6. CONCEPT WATER SERVICING ARRANGEMENT

6.1 Service schematic

Figure 4 shows the concept as a schematic: separate domestic and fire takeoffs from the frontage main, with the domestic service passing through isolation, strainer, the DN50 master meter and containment backflow protection to the unit distribution, and the fire service passing through isolation and backflow protection, the fire pump set with a bypass, and the brigade booster assembly to the hydrant and sprinkler systems; a domestic pressure-boosting arrangement sits after the containment backflow device. The schematic is consistent with drawing WS-01 in Appendix A; it does not fix pipe routes, levels or equipment dimensions.

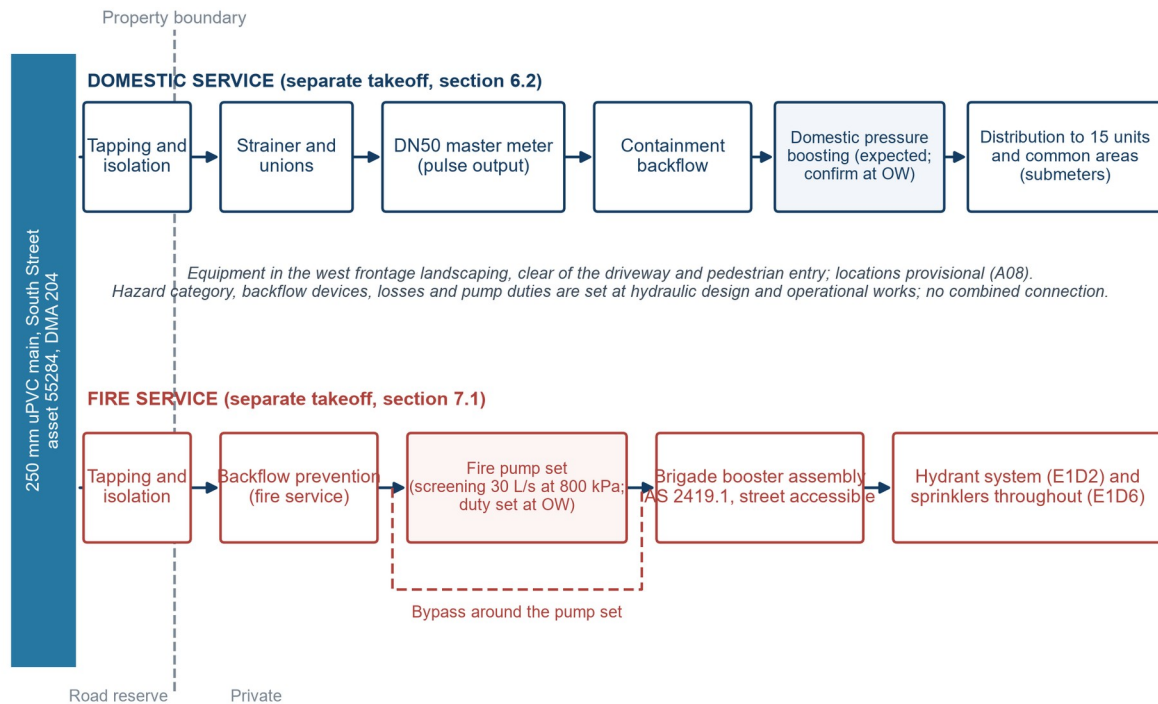


Figure 4: Concept service schematic: separate domestic and fire connections

Concept only. Equipment sequence and elements per sections 5 to 7 and WS-01; pump duties are screening values on the published standards of service (sections 5.2 and 7.2), finalised at operational works.

6.2 Meter and connection detail

Show a provisional DN50 mechanical master meter with pulse output, isolation, required strainer/unions and Council-approved containment backflow protection in an accessible frontage alcove. Final meter selection must satisfy continuous/peak flow and pressure-loss limits. Verify the hazard category; the 5 m loss allowance does not select a backflow device. Provide individual dwelling submeters and a common-area metering arrangement to the approved scheme. [R8; A08]

Council's published connection guidance excludes combined fire/water connections. WS-01 therefore shows separate takeoffs. The DN50 location inside the boundary requires Council approval; small-meter boundary offsets are not applied to it. Keep equipment clear of vehicle access, retaining walls, electrical pillars and drainage structures; verify actual offsets and service-owner clearances. [R8]

6.3 Civil water concept drawing WS-01

Drawing WS-01 (Appendix A, A3) shows the connection points on the 250 mm frontage main, the domestic meter alcove, the brigade booster assembly and the fire pump in the west frontage landscaping, the pedestrian entry and driveway kept clear, and the notes that carry the assumptions of Table 8. The drawing is a Rev 3 concept marked not for construction.

7. FIRE PROVISION AND BOOSTER ASSESSMENT

7.1 Fire-system basis

The building is a Class 2 building of four storeys, levels 1 to 3 over a ground floor car park, with a gross floor area of 1,398 m² and an effective height well under 25 m. Under NCC 2022 Volume One, Part E1, a fire hydrant system is required because the total floor area exceeds 500 m² and a fire brigade station is within 50 km (E1D2), and sprinklers are required throughout the building because it has a rise in storeys of four or more and an effective height of not more than 25 m (E1D6). A fire

brigade booster assembly to AS 2419.1-2021 is required for the hydrant system. This is the concept basis adopted here as the designer's interpretation of the code; the certifier confirms the governing edition, amendments and any performance solution at building approval. The adopted 30 L/s demand does not assert a particular hydrant/sprinkler arrangement; simultaneous flows, residual pressures and duration are set at fire design. [R9; A07]

A brigade booster assembly allows fire brigade assistance to a fire system. It does not establish normal automatic supply adequacy. Include an assembly accessible from South Street; the fire designer confirms appliance access, visibility, separation/protection from the building, signage, connections, bypass arrangement and brigade requirements at building approval.

7.2 Pump assessment under estimated conditions

Adopt fire flow 30 L/s, hydraulic bore 150 mm, route length 80 m, $C = 130$, elevation 12 m, device/fitting loss 5 m and remote outlet target 700 kPa. Velocity = 1.70 m/s and friction = 1.62 m. Required pressure at service takeoff = $700 + 9.80665 \times (12 + 1.62 + 5) = 882.6$ kPa. Against the published standard of 12 m (117.7 kPa) residual at 30 L/s, the pressure deficit is 764.9 kPa. [A04–A07; C02]

Table 11: Fire service pressure budget at 30 L/s (C02)

Line	Basis	Head (m)	Pressure (kPa)
Terminal pressure at the critical outlet	Target adopted for screening (A07)	71.38	700.0
Elevation, takeoff to critical outlet	12 m (A06)	12.00	117.7
Pipe friction	Hazen–Williams, $Q = 30$ L/s, $D = 150$ mm, $L = 80$ m, $C = 130$ (A05, A06)	1.62	15.8
Device and fitting loss allowance	5 m lump allowance (A06)	5.00	49.0
Required pressure at the service takeoff	Sum of the lines above (C02)	90.00	882.6
Available pressure at the published standard	Redland Water desired standard of service (A04): 12 m residual at 30 L/s	12.00	117.7
Shortfall to be boosted	Available minus required; velocity 1.70 m/s	-78.00	-764.9

The concept therefore includes a fire pump set. An indicative screening duty of 30 L/s at 800 kPa differential provides about 35 kPa allowance above the calculated deficit. This is not a selected pump, guaranteed supply duty or final design margin. Confirm suction pressure, permissible direct pumping, pump configuration/reliability, power or fuel, starting controls, shutoff pressure, relief and component pressure ratings.

Figure 5 draws both pressure budgets as hydraulic grade lines from the takeoff to the critical outlet, with the published standard shown as a dashed line; the shortfall above it is the boosting each service needs.

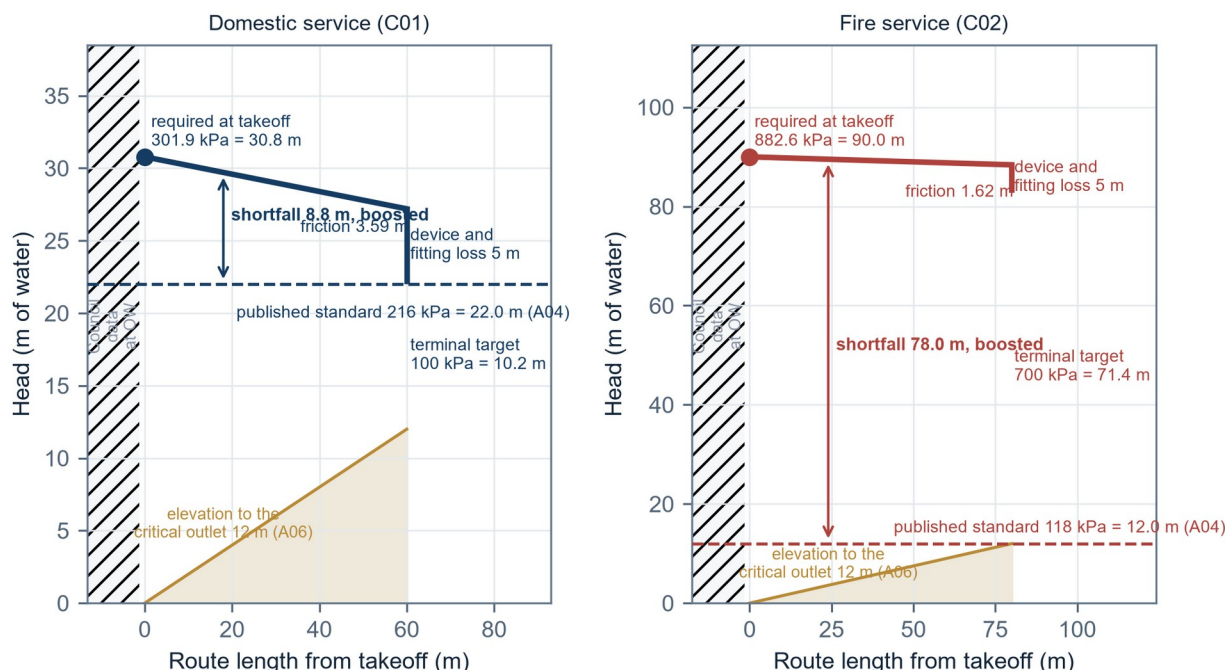


Figure 5: Pressure budget and hydraulic grade from the takeoff to the critical outlet, domestic and fire services, on the published standards of service

Lines from calculation cases C01 and C02 (Tables 10 and 11); elevation, losses and targets are inputs A05 to A07; available pressures are the published standards (A04). Council's curve values replace the standard lines at operational works.

7.3 Flow and storage dependency

The published standard provides 30 L/s for four hours for this building category, so no on-site storage is included in the concept. If Council's site-specific data at operational works shows that the network cannot sustain the confirmed fire demand, adding pump head does not solve the deficiency: a compliant break/suction tank with refill analysis, altered supply arrangement or network works would then be necessary, and the building and landscape layout revisited.

The held 2017 Netserv Table 12-1 lists 30 L/s for four hours for residential buildings over three storeys, with two-thirds peak-hour background demand. This is the utility's network standard, adopted here as the available supply; it is not this building's confirmed simultaneous demand nor an instruction to install a 432 kL tank. The building fire-storage calculation is confirmed by the fire designer at building approval. [R7]

8. SENSITIVITY AND CONCEPT COORDINATION

8.1 Sensitivity to supply and fire criteria

Each fire row is an independent scenario using the same geometry, C and 5 m loss allowance. Holding device loss constant is a screening simplification; final loss must vary with flow using verified device curves. No interpolated supply curve is implied.

Table 12: Sensitivity of the required takeoff pressure and pump differential to fire flow and outlet target (C03)

Flow / terminal target	Required at takeoff	Pump differential at the published 118 kPa residual
10 L/s / 700 kPa	868.8 kPa	751.1 kPa
20 L/s / 700 kPa	874.2 kPa	756.5 kPa
30 L/s / 700 kPa	882.6 kPa	764.9 kPa
30 L/s / 350 kPa (alternative criterion only)	532.6 kPa	414.9 kPa

At 30 L/s and a 700 kPa target, the published 118 kPa residual requires about 765 kPa differential; supply pressures of 200, 350 and 500 kPa would require approximately 683, 533 and 383 kPa. The actual supply curve and required outlet target drive pump selection at operational works. For domestic demand of 3 L/s, the published 216 kPa minimum gives a shortfall of 86 kPa against the 302 kPa requirement; supplies of 350 and 500 kPa would give margins of +48 and +198 kPa. [C03]

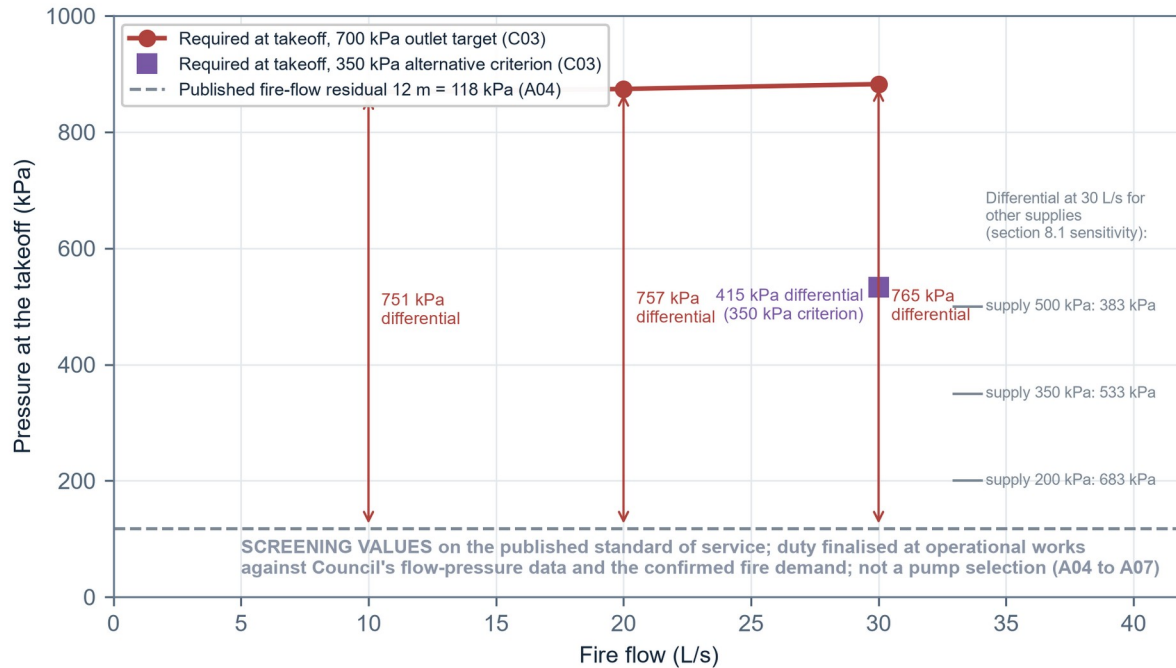


Figure 6: Pump duty screening: required takeoff pressure and differential against the published fire-flow standard

Points from calculation case C03 against the published 12 m residual at fire flow (A04); the differentials for other supplies are the section 8.1 sensitivity values. Not a pump selection; duty set at operational works.

8.2 Layout, maintainability and constructability

WS-01 shows the meter/booster concept in the landscaped frontage west of the driveway, adjacent to the pedestrian entry. The locations are provisional, with no claim that the manufacturer's equipment or mandatory working clearances fit. Keep the existing pedestrian route and vehicle entry unobstructed. Pump enclosure, noise, ventilation, flood protection, power/fuel and maintenance removal space must be coordinated before the civil layout is fixed.

Nominate the water connection asset with Council and confirm main material, cover and condition by service locating and approved investigation. Obtain connection and road-reserve approvals; protect the public supply with the selected backflow arrangements. Coordinate water/fire routes with sewer, stormwater, electricity and landscaping. The schematic does not determine vertical separation, cover or exact tapping position.

8.3 Ownership and lifecycle

Council's ownership boundary, meter access rights and the body corporate's common-service responsibilities require confirmation in the metering scheme. Arrange readable labels, isolation of maintainable sections, drainage of enclosures, corrosion protection, replaceable components and accessible test points. Fire-system testing and maintenance must follow the approved system's requirements; do not adopt an unverified interval from this concept.

9. INFRASTRUCTURE WORKS CODE PO5 TO PO9

Outcome text is taken from the held City Plan version 14 [R6, printed page 393 / PDF page 397]. The response distinguishes the concept measures from verification still required; no final compliance certificate is given.

Table 13: Infrastructure Works Code PO5 to PO9: response and close-out status

Outcome	Response and evidence	Status / close-out
PO5 – Safe, efficient and functional network connection; loads within capacity.	Separate domestic/fire takeoffs; identified frontage asset; estimated 10.35 kL/day and 3 L/s domestic, plus fire screening. WS-01 and sections 5 to 7.	DEMONSTRATED ON THE PUBLISHED STANDARD: the development's 0.12 L/s average, 3 L/s peak and 30 L/s fire flow are within the desired standards of service for the 250 mm main. Connection permission and Council's site-specific data at operational works.
PO6 – Minimise whole-of-life cost, including maintenance.	Direct domestic supply where adequate; fire pump only as required by verified duty; accessible isolation and modular meter/backflow equipment. Sections 5 to 8.	CONCEPT RESPONSE: compare accepted direct, pumped and tank-assisted options against Council's data at operational works; do not procure from this concept.
PO7 – Easy and safe access for repair/maintenance.	Street-accessible frontage location, off driveway and pedestrian route; labels, isolation and replaceable equipment. WS-01.	CONCEPT RESPONSE: verify safe clearances, brigade access, lifting/removal, Council meter access and landscape coordination.
PO8 – Fit for purpose throughout design life.	Appropriate pipe/device selection, corrosion protection, pressure-rating and shutoff checks, backflow protection and maintenance regime. Sections 5 to 8.	CONCEPT RESPONSE: final material, duty, maximum pressure, protection, lifespan and maintenance documentation required.
PO9 – Reliable supply sufficient for anticipated potable and non-potable use.	Reticulated supply, unit/common metering, explicit demand and pressure budget; provisional fire pump; flow/storage contingency. Sections 4 to 8.	DEMONSTRATED ON THE PUBLISHED STANDARD: reticulated supply at Redland Water's desired standards of service, with domestic boosting and a fire pump set in the concept. Duties, duration and reliability finalised at operational works and building approval.

9.1 Response to Item 4

A civil water concept drawing is provided as WS-01, showing separate domestic and fire connections, a provisional DN50 domestic master meter, a brigade booster assembly, which NCC 2022 clauses E1D2 and E1D6 and AS 2419.1 make a requirement for this four-storey Class 2 building, a fire pump set and a domestic pressure-boosting arrangement. On Redland Water's published standards of service, pressure boosting is required for the fire service and expected for the domestic service; that answers the second part of the booster question. The development's demand is within the published standard for the 250 mm main. The final pump duties, any storage need and the detailed PO5 and PO9 verification are reconciled against Council's site-specific supply information and the fire design at operational works and building approval.

AO9.1 reticulated connection and AO9.2 applicable SEQ Code design/construction are the intended delivery route. The final response will identify the accepted connection detail and applicable Council requirements. [R6]

10. INFORMATION REQUIRED AND MATTERS OUTSTANDING

Table 14: Information required and responsibilities

Owner	Required actual information / review result
Council water team, via the Council assessment manager	For operational works: confirm the frontage main asset and permissible separate domestic/fire connections; supply the current/ultimate Q-H curves at the nominated takeoff (requested 21 September 2026), including background demand, datum, model scenario and constraints; confirm whether post-development loading or field verification is required.
Fire and hydraulic designer / certifier, at building approval	Confirm the code edition and any performance solution; simultaneous fire flows, residual pressure, duration and pump/storage requirements; actual loss data, levels and coordinated equipment layout. No architectural input is required for the RFI concept: the plan issue and ground floor layout are resolved in section 4.1.

10.1 Outstanding verification

At operational works, replace A01–A09 with verified values or expressly justified retained design assumptions. Check both minimum operating pressure and maximum/static/shutoff pressure; calculate all meter, valve, backflow, pipe and fitting losses at actual demands. Confirm simultaneous domestic/fire demand and network assessment scenario. Reassess flow sufficiency and storage independently of pressure.

Resolve the architectural base, main/tapping location, equipment footprint and access, fire safety clearances, acoustic/ventilation requirements, landscape area, stormwater/sewer conflicts and any tank contingency. Update the drawing and compliance table with the accepted arrangement and supporting evidence.

10.2 Status of this revision

This final report is issued for submission to Redland City Council in response to Information Request Item 4. The demand and pressure assessment adopts Redland Water's published desired standards of service as the existing level of service, with the other inputs stated in Table 8; the fire-system basis is the designer's interpretation of NCC 2022 Volume One and AS 2419.1. Council's site-specific flow and pressure data, requested on 21 September 2026, is applied at operational works before the services and pumps are sized. The document does not authorise procurement or construction. Revision 5 is the public issue of this report; its engineering content is unchanged.

10.3 Revision record

Rev 5, 15 October 2026, public issue of Rev 3: a personal name, an internal action note and a working reference note removed; no change to engineering content. Rev 4, 24 September 2026, was a review revision that was not issued; its water-network model assessment was issued within the Stormwater Management Plan, Revision 5.

Rev 3, 22 September 2026, for the Information Request response: replaces the Rev 2 unquantified capacity assertion with a source and assumption register, existing network and pressure-zone maps, domestic and fire pressure budgets on the published standards of service, a sensitivity assessment, the separate-service concept drawing WS-01, an outcome-by-outcome PO5 to PO9 response and a defined operational-works information requirement. Fire-system basis stated from NCC 2022 Volume One (E1D2, E1D6) and AS 2419.1. Council flow and pressure data requested 21 September 2026 for operational works. Rev 2, 9 January 2026: DA lodgement baseline.

11. CONCLUSIONS

Connection. The development can connect to the 250 mm uPVC main in South Street (asset 55284, DMA 204) with separate domestic and fire takeoffs, a DN50 master meter with containment backflow protection, and a brigade booster assembly accessible from South Street, as shown in

Figure 4 and drawing WS-01. Connection permission, tapping position and the meter location inside the boundary remain subject to Council approval.

Existing service and impact. The existing supply is taken at Redland Water's published desired standards of service (Table 5). The development adds 0.12 L/s on an average day and 3 L/s at peak to a 250 mm main, a velocity of about 0.06 m/s from the development alone, and its 30 L/s fire flow is the standard's own category for residential buildings over three storeys; the load is within the published standard for the frontage main and no network augmentation is expected (Table 13, PO5).

Domestic supply. On the inputs of Table 8, the domestic service requires about 302 kPa at the takeoff at 3 L/s against the published 216 kPa minimum (Table 10), so a domestic pressure-boosting arrangement for the upper floors is included in the concept, screened at 100 kPa differential; it is deleted at operational works if Council's data shows at least 302 kPa at peak demand.

Fire provision. A fire hydrant system and sprinklers throughout are required by NCC 2022 Volume One clauses E1D2 and E1D6, and a brigade booster assembly to AS 2419.1 is therefore required (section 7.1). Against the published 118 kPa residual at 30 L/s the fire service needs about 765 kPa of additional pressure (Table 11), so a fire pump set is included, screened at 30 L/s and 800 kPa differential; the standard's 30 L/s for four hours means no on-site storage is included (section 7.3).

Performance outcomes. PO5 and PO9 are demonstrated on the published standard; PO6, PO7 and PO8 are addressed at concept level (Table 13).

Operational works. Council's site-specific flow and pressure data, requested on 21 September 2026, is applied at operational works before the services and pumps are sized: it confirms inputs A04 and A09, fills the Council rows of Table 7 and the curves of Figures 3, 5 and 6, and sets the final duties.

12. PROFESSIONAL RELIANCE AND CERTIFICATION

This report has been prepared in accordance with accepted engineering practice for development application level assessment. It relies on Redland City Council's public asset mapping, the lodged and current architectural plans, Redland Water's published desired standards of service adopted as the existing level of service, and the hydraulic inputs stated in section 4.2. Council's site-specific flow and pressure information, requested on 21 September 2026, is to be applied at operational works before the services and pumps are sized. The concept is subject to Council connection approval, the building fire design and detailed design.

The calculations, concept drawings and this report were prepared and reviewed by Craig Harris, RPEQ Civil Engineer, registration 13194, RPEQ Consulting. This revision is certified for issue as the water servicing and capacity assessment for the development application, in response to Council Information Request Item 4, subject to the assumptions and verification requirements stated in this report. It is not a construction issue. Revision 5 is the public issue of Revision 3: internal working notes are removed and the engineering content is unchanged.

Certification

Role	Name	Registration	Revision	Date	Signature
Prepared, reviewed and certified for issue by	Craig Harris, RPEQ Civil Engineer	RPEQ 13194	Revision 5	15 October 2026	

13. REFERENCES AND CALCULATION RECORD

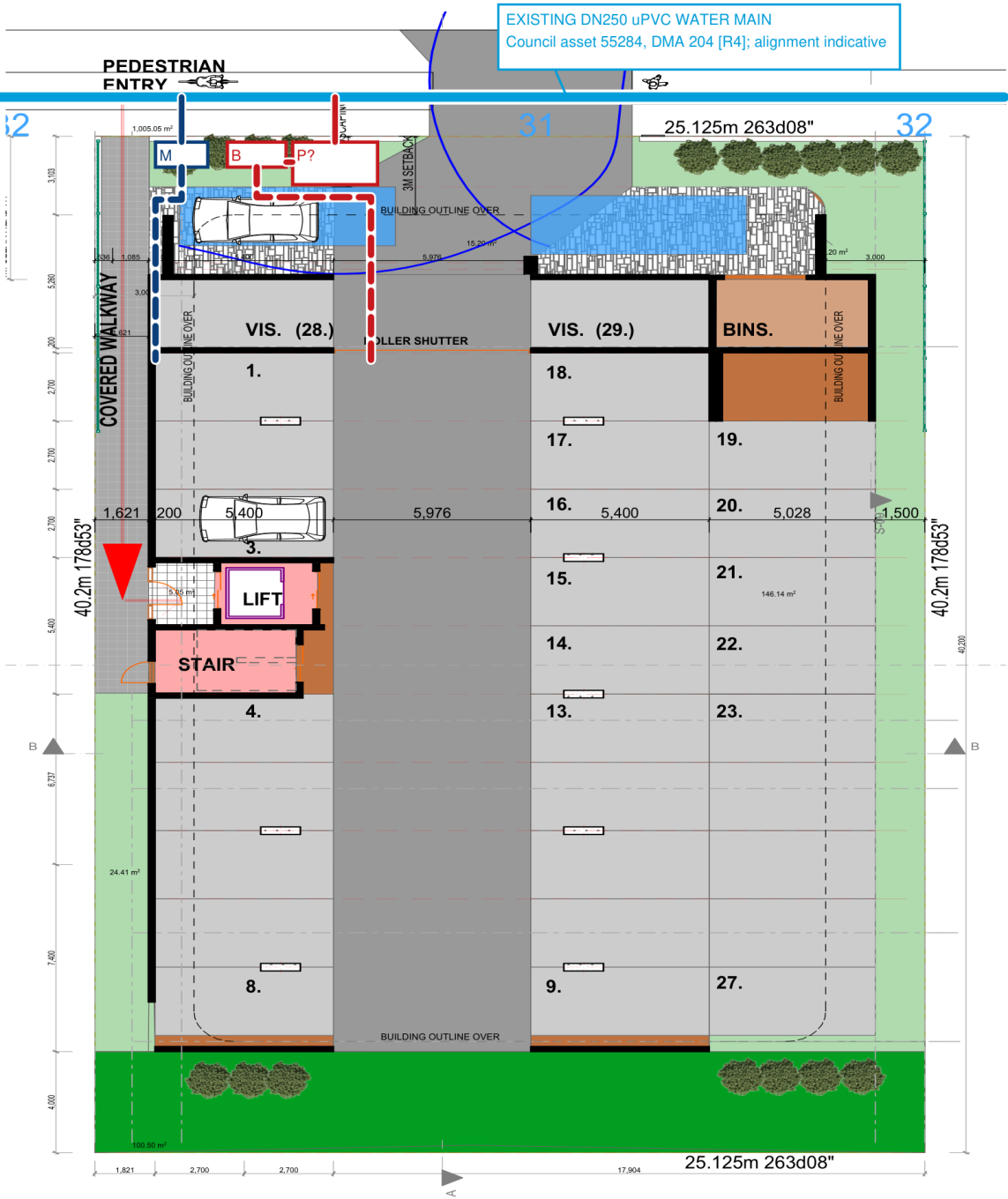
- R1 Redland City Council, Information Request MCU26/0056, 9 June 2026, page 2, Water Item 4.
- R2 Interworks Architects, submitted architectural plans for MCU26/0056, drawing 2.1 Issue A, 30 October 2025 (Appendix A of the application).
- R3 Interworks Architects, drawing 2.1 Issue C, 15 June 2026.
- R4 Redland City Council Asset Mapping, public ArcGIS map service (assets/a_asset_mapping): Water Pressure Pipes, Water Hydrants, Water Valves and District Metered Areas layers, queried 22 September 2026. Query responses are retained in the project calculation record.
- R5 Redland City Council supplied data set (Objective Connect: Cleveland model, IDM and wastewater collections), inspected 21 September 2026; no site-specific water supply flow or pressure result identified.
- R6 Redland City Plan version 14, updated 8 April 2026, Infrastructure Works Code, printed page 393. Applicability of the version awaits planning confirmation.
- R7 Redland Water, Netserv Plan Part A, September 2017, section 12, Table 12-1, page 29. Historical benchmark only; not a current site-specific supply result.
- R8 Redland City Council, Water and sewerage connections; Water meters; Information for hydraulic designers (Water Network Flow and Pressure Information Report), web content retrieved 21 September 2026: <https://www.redland.qld.gov.au/Water-supply-and-sewerage/Water-and-sewerage-connections>. Confirm detailed requirements with Council.
- R9 Australian Building Codes Board, NCC 2022 Volume One, Part E1, clauses E1D2 and E1D6: <https://www.abcb.gov.au/editions/ncc-2022/adopted/volume-one/e-services-and-equipment/part-e1-fire-fighting-equipment>, retrieved 21 September 2026; reference edition only; the certifier confirms the governing edition at building approval. AS 2419.1-2021 Fire hydrant installations.
- R10 Redland City Council Development.i public application documents, read 21 September 2026: MCU22/0081 Beveridge Road (document A7093489); MCU18/0207 Middle Street (A3487872); MCU20/0077 Queen Street (A5273848); MCU20/0028 Ziegenfusz Road (A4777514); RAL23/0034 Lind Street (A12387136); OPW18/0152 Wrightson Road (A3471028); OPW002165 Kinross Road (A2402911).
- C01–C03 Reproducible calculation record held by RPEQ Consulting for this application, on the published standards of service (available pressure 22 m at the boundary for the domestic case and 12 m residual at 30 L/s for the fire case). All numerical inputs and units are stated in sections 4 to 8. Calculations use unrounded intermediate values; reported results are rounded. The formula is a preliminary steady-state pipe-friction model, not a calibrated network or building fire model.
- Appendix A Civil water concept drawing WS-01, Rev 3, 22 September 2026, landscape A3.

APPENDIX A: CIVIL WATER CONCEPT DRAWING WS-01

RPEQ CONSULTING | CIVIL WATER CONCEPT | WS-01

134 South Street, Thornlands | MCU26/0056 | Rev 3 - For RFI response - 22 September 2026

SOUTH STREET (road reserve)



BLUE = DOMESTIC RED = FIRE DASHED = INDICATIVE ROUTE

Read with Water Servicing Capacity Assessment, Rev 3. All proposed sizes, pressure inputs and equipment locations are provisional; Council site-specific supply data is applied at operational works. NOT FOR CONSTRUCTION.

CONCEPT DETAILS AND HOLD POINTS

1. M - Domestic DN50 master meter (provisional), pulse output, isolation, unions/strainer and approved containment backflow, with a domestic pressure-boosting arrangement expected (screening 100 kPa differential against the published 22 m minimum). Candidate alcove inside boundary; Council siting approval required.
2. B - Separate fire brigade booster assembly (provisional), fed through the fire pump set P?. Verify appliance access, visibility, building separation/protection and brigade requirements. No certified assembly dimensions.
3. P? - Fire pump set between the fire takeoff and B. Screening duty: 30 L/s at 800 kPa differential, based on the published fire-flow standard of 12 m residual at 30 L/s and a 700 kPa remote target; duty set at operational works. Manufacturer footprint, clearances, noise, ventilation and power/fuel unresolved.
4. Boxes are symbolic location reservations, not equipment footprints. No claim of fit or landscape compliance. Keep western pedestrian route and central driveway clear. Architect/fire designer must coordinate.
5. Nominal service: domestic DN50; fire DN150. Independent connections required; Council approval of fire tapping/service size is outstanding. Dashed internal routes lead to building distribution/riser, exact alignment to be designed.
6. No storage tank is required on the published standard of 30 L/s for four hours. If Council data at operational works shows the supply cannot sustain the required fire flow/duration, revise the site layout for a compliant tank/pump arrangement or accepted network solution.
7. Verify survey, underground services, main depth/material and tapping point. No construction setout, levels, cover, offsets or clearance certification is provided.
8. Base: submitted architecture Issue A, drawing 2.1, 30 October 2025 [R2]; ground floor unchanged in Issue C, 15 June 2026 [R3], checked 21 September 2026. Do not scale this cropped/annotated concept.

SERVICE PRINCIPLE - DIAGRAMMATIC

Main -> separate domestic takeoff -> isolation / backflow / meter (M) -> domestic distribution
Main -> separate fire takeoff -> isolation / backflow -> fire pump set (P?) with bypass -> brigade booster assembly (B) -> fire distribution

Device order and brigade connection bypass are to be confirmed by the fire designer and Council. This schematic is not an installation detail.